

Renfrew, and then Dumbarton and Edinburgh in Scotland, and in England, Derby, Warwick, Essex, Middlesex, Surrey, Hants, Sussex and Cornwall. The disease is strictly localised in four very definite centres, each, with the exception of that in which Cornwall is situated, containing a group of five counties. These counties are, of course, under different local authorities, so that it is impossible, in some cases at least, to obtain combine action in the matter of taking measures to stamp out the disease. It is objected that each authority must take this matter into its own hands, and act as it thinks best; but where the welfare of adjacent districts is so closely involved, as in such a case as this, some central authority might surely bring pressure to bear in order to ensure conjoint action. The Board of Agriculture, for instance, might, either by diplomacy or financial argument, compel joint action on the part of the counties situated in the above infected areas, leaving the uninfected areas free to act as they think proper. A muzzling and registration order so enforced for a couple of years would, in all probability, bring about the disappearance of rabies from our island. It is sometimes objected that the muzzle is a cruel apparatus. We have it on the authority of the most eminent veterinarians, that the cage muzzle, when properly fitted so as to allow the animal to lap water and eat grass, but not to bite, causes little or no discomfort to the dog, but that the strap muzzle, which is recommended by some of those who pose as the "friend" of the dog, is not only an uncomfortable but actually an unhealthy apparatus, as it keeps the animal from opening its mouth and getting the free use of its tongue. In Norway, Denmark and Sweden, rabies is little known; a system of quarantine is insisted upon, so that none but valuable dogs, and therefore animals constantly under observation, can gain access to these countries. Once the disease has been stamped out, it would be a comparatively easy matter to prevent its reintroduction. Even Darwin, in his time, observed that there was no hydrophobia in Van Dieman's Land and Australia, and that it only made its appearance in South America in 1803, and that it had then apparently made its way south from Central America. In the old days of long passages to these places, dogs were for long under observation before they were introduced into the new countries, and in the case of America the disease must have first appeared in the north, being introduced after a comparatively short voyage, and then gradually making its way south. Muzzling, and the taking up of unmuzzled dogs, when properly carried out, has been so successful hitherto, not only locally in this country, but generally in other countries, that the new order will be warmly welcomed by all who have studied this matter carefully, as the first step towards a really efficacious measure—combined action on the part of the authorities in the rabies areas.

NOTES.

"THE Diffusion of Metals" is the subject of the Royal Society's Bakerian Lecture, which is to be delivered to-day by Prof. Roberts-Austen, C.B., who has obtained some singular experimental results connected with the mobility of solid metals. Many experimenters in this country, especially Prof. Graham and Lord Kelvin, have studied the diffusion of gases and saline solutions, and Prof. Roberts-Austen has measured the rate at which certain metals will penetrate each other. He finds that solid gold, for instance, will diffuse into, and move about slowly in lead, even at the ordinary temperature of the air, and with considerable rapidity if the lead be warmed, though far from melted. Evidence as to the presence of wandering atoms in a solid, possesses much interest now that views as to the nature of metals and other solids have been extended by the discovery that certain rays of light will penetrate them.

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THE announcement of the attainment of the North Pole by Dr. Nansen has been received with great popular interest and even enthusiasm. According to Prince Kropotkin, the correct text of the telegram which was received at St. Petersburg concerning Nansen was as follows:—"Irkutsk, January 31 (February 12).—The contractor for Nansen, Kushnareff, through the Kolymsk *ispravnik* (chief of police) Kandakoff, by mail from Yakutsk to Kirensk, and thence by telegraph, informs the *Eastern Review* that Nansen has reached the Pole, has discovered land, and returns." M. Kandakoff appears not to be the chief of the police of the Verkhoyansk district, but a "councillor to the Provincial Government of Yakutsk and a member of the Yakutsk expedition," which fact gives a much greater weight to the news. The Russian Government immediately took steps to have the truth of the report tested, but some time must necessarily elapse before authoritative confirmation is received. The absence of date and of any hint as to whether a direct message from Nansen or his crew had been received, lead us to suspect that the report may be a rumour similar to that which reported the *Fram* in the ice east of Greenland last autumn. It seems rather late in the season, even allowing for the slow rate of travelling in North-eastern Siberia, for information to come from the New Siberian Islands; while if Nansen had landed himself on the Asiatic coast, it is difficult to believe that his own dispatches should not have reached the telegraph as soon as the vague report. On the other hand, it is necessary to remember that there is nothing improbable in the news. If land intervened and stopped the drift of the *Fram*, a land expedition would certainly have been made, and the ship afterwards taken south by the clearest route irrespective of destination. She might have been frozen up at the beginning of winter somewhere within reach of the New Siberian Islands, and it is possible enough that she was visited by native hunters, who may have carried a message. While, therefore, we fully recognise the possibility of the news being authentic, and it becomes more probable as the source of the information is inquired into, we must await further information before believing that the past record of Arctic exploration has really been so brilliantly surpassed.

MR. WILLIAM W. ROCKHILL, whose journeys through Mongolia and Tibet, and his works upon them, have earned him distinction among geographers, has been promoted to the assistant-secretaryship in the State Department at Washington.

MISS CATHERINE W. BRUCE has recently made another addition to her numerous benefactions to astronomy in both Europe and America, by presenting to the University of Chicago the sum of one thousand dollars, to be used for the purpose of providing illustrations for the *Astrophysical Journal*.

THE death is announced of M. Jules Reiset, member of the Section of the Rural Economy of the Paris Academy of Sciences, and the author of many valuable contributions to agricultural chemistry and animal physiology.

A LECTURE will be delivered, on Thursday next, at the Royal Artillery Institution, Woolwich, by Dr. G. H. Bryan, F.R.S., on "Flight and Flying Machines."

THE Ethnographical Survey Committee of the British Association would be glad to receive offers of assistance from persons capable of making the requisite measurements of individuals belonging to rural populations. The Committee would supply instruments and full information. It is requested that competent observers might find it interesting to occupy themselves during some part of the Easter vacation in this manner. Applications may be made to the Hon. Sec., Mr. E. S. Hartland, Highgarth, Gloucester.

PROF. D. KIKUCHI informs us that on December 28, 1895, an Imperial Ordinance was promulgated by which a new standard time was established in Japan. The ordinance read as follows: (1) The standard time of the Empire hitherto in use shall henceforth be called the Central standard time. (2) The time of the meridian of 120° east longitude shall be the standard time of Taiwan (Formosa), Hōko group (the Pescadores), and Taeyama and Miyako groups, and shall be called the Western standard time. (3) This ordinance shall come into effect on January 1 of the twenty-ninth year of Meiji (1896).

THE Hayden Memorial Medal of the Philadelphia Academy of Natural Sciences has been awarded to Prof. Karl von Zittel, whose services to the sciences of geology and palæontology extend continuously over a period of thirty years. Born in 1839, Prof. von Zittel was, at the age of twenty-four, appointed to the Professorship of Mineralogy at Karlsruhe, and three years later to the Professorship of Palæontology at the University of Munich, a position, jointly with that of Director of the Palæontological Museum, which he still holds. His published works cover a large range of personal investigation, not the least important of which are the researches into the structure and physiography of the Libyan Desert and the Sahara, and his monumental work, "Handbuch der Paläontologie," which has not long been completed.

THE work of the Marine Biological Association at Plymouth has, for a number of years, been carried on under great difficulties, owing to the want of a suitable steamboat capable of working in the Channel. We are glad to be able to announce that this difficulty has now been overcome by the purchase of the steam fishing yacht, *Busy Bee*, from Mr. C. E. Treffry, of Fowey. The vessel is 56 feet long, with a registered tonnage of 7.9, and is a good sea-boat, capable of going anywhere in the English Channel. With the increased facilities for marine work which will thus be offered, it is hoped that a still larger number of naturalists will visit the Laboratory. Applications for the use of tables during the Easter vacation, including, when desired, participation in the dredging and trawling work to be carried on by the new yacht, should be sent without delay to the Director.

WE regret to notice the death, on Sunday, of General J. T. Walker, C.B., F.R.S., whose work as Superintendent of the Great Trigonometrical Survey, and Surveyor-General of India, is widely known and appreciated. From an obituary notice in the *Times* we learn that he was born in 1826, and entered the Bombay Engineer Corps in 1844. He joined the Trigonometrical Survey in 1852, and, except for a short time during the Mutinies, he was incessantly employed on work connected with it, under Sir Andrew Waugh, until he succeeded that officer as Superintendent in 1861. He held this post for twenty-two years, combining with it during the last five years the Surveyor-Generalship and the charge of the Revenue Surveys. He continued and completed the original scheme of the Great Trigonometrical Survey, and conducted numerous collateral operations connected with it. General Walker's labours were not confined to geodesy. He was in the first rank as a geographer. On retiring from India in 1883, he became an active member of the Council of the Royal Geographical Society, and was an authority on all questions relating to Central Asia. Last July he took a leading part in the geodetical business of the International Congress, and was doing useful geographical work up to within a short time of his death.

WE cordially welcome the *Centralblatt für Anthropologie, Ethnologie und Urgeschichte*, edited by Dr. G. Buschan, as supplying a real need. Other sciences, such as zoology, botany, or chemistry, have journals the aim of which is to keep their

readers abreast with the literature of their respective subjects. Till now the very comprehensive study of anthropology has been without such a necessary journal, although several anthropological serials make a point of giving some idea of current literature. Dr. Buschan has secured the co-operation of a large number of colleagues, which will ensure catholicity in the selection of notices. There are to be a few quite short original articles, and various items of general interest and personal notices. This first number contains short, clear notices of 112 papers and books. We hope that the "bibliographische Übersicht," which is promised, will give the current literature as exhaustively as is possible. If this is done, the new journal will be of the greatest value to all those interested in the study of man.

At the annual meeting of the Royal Astronomical Society, on Friday, the gold medal of the Society was awarded to Dr. S. C. Chandler for his many astronomical investigations, and especially for his work in connection with the variations of latitude.

THE successive deaths, following so soon one after the other, of the two great American systematic botanists, Dr. Asa Gray and Dr. Sereno Watson, suspended the publication of their great Synoptical Flora of North America, of which two parts were published, and were reissued by the Smithsonian Institution in 1886. Arrangements have now been made for carrying on the publication, and a fascicle of upwards of 200 large octavo pages is published, under the editorship of Dr. B. L. Robinson. It comprises the orders of Polypetalæ from Ranunculaceæ to Frankeniaceæ.

ACCORDING to the recent investigations of Dr. R. F. Kaindl (*Globus*, lxi., 1896, pp. 69, 90), the Huzulen retain many primitive customs; these people are Slavs who inhabit the Galician Carpathians, and are nominally Roman Catholics. Everywhere one comes across wooden crosses erected over buried brandy-bottles. In 1894 a "Brandy-prophet" appeared; he was a simple peasant who waged a successful warfare against brandy-drinking. The zeal of the people constrained the clergy to bury the spirit with ceremonies; and now in this country the use of brandy has ceased; and the words of an old Huzulen may be true, that at the present time only those drink brandy who are worth nothing. A gypsy, who had sent his wife away, bought the daughter of a Huzulen for fifty florins; he was had up by the magistrate, but that had no effect; in a year he was tired of her, and then he hired the wife of another Huzulen for sixty florins; again the law was powerless, and at the end of the year the husband came for his wife. There are two remedies for back-ache—one is for the priest to walk on the patient's back in church, and the other is to let a bear walk on it. Weasels, snakes, frogs, puppies, and kittens may not be killed, and there are numerous charms against the two first. For three days before the Huzulen moves into a new house he throws a black hen on it, so that snakes may not nest there. Black cattle are lucky. The mentioning of certain words for simmering and boiling is prohibited when applied to milk, lest harm should come to the cows. The grave-diggers and coffin-makers wash their hands over a grave to signify that they are not to blame for the sorrow, and the relatives ask the latter not to be angry with the dead for the trouble he has caused them, and not to ask for payment from him in the next world. Several original sketches illustrate this article.

GEOLOGY and agriculture, as well as meteorology, writes Prof. Abbe in the *Monthly Weather Review*, are interested in the part played by the small quantity of carbonic acid gas that exists in the atmosphere. The leaves absorb and assimilate a portion; the falling raindrops and the surface water of the ocean absorb

another portion; it is exhaled from the lungs, and given off in still greater quantities from every burning substance. It may accumulate temporarily in some regions, but the slow diffusion and swifter winds carry it away. It ought to diminish as we ascend above the earth's surface, but the rapidly rising and falling currents of air tend to preserve a fairly uniform mixture very much as they do in the case of aqueous vapour. Evidently there is a general balance between the production and absorption of carbonic acid gas, so that, like the temperature of the air and the quantity of rain or any other meteorological element, we find no great progressive secular increase or diminution. An article in *Wollny's Forschungen* (1895, vol. xviii. p. 409) reviews the latest additions to our knowledge of the distribution of carbon dioxide in air. A comparison of the proportion of the gas in samples of air obtained near the earth's surface with that of samples collected by S. A. Andrée at various altitudes, failed to prove any diminution of carbon dioxide with altitude up to the highest point, 4300 metres, obtained in the balloon ascensions. On the other hand, the percentages of the gas by volume throughout the different strata of air, are very much the same as those observed at the surface of the earth. An apparent dependence upon the wind was, however, suggested by the results, and when the percentages were discussed from that point of view, the general conclusion arrived at was that a descending mass of air brings with it a higher percentage of carbonic acid gas, which is subsequently diminished by absorption near the earth's surface, so that the ascending current has a smaller percentage. The question here raised is one of great importance in the theory of the interaction of the atmosphere and the earth, and it can only be brought to a definite solution when the greatest possible number of investigations into the percentages of carbonic acid gas in the atmospheric strata are carried out by means of balloon voyages.

UNDER the sensational title of "Longitudinal Light," a paper by G. Jaumann appears in *Wiedemann's Annalen der Physik und Chemie*. It is based upon the law of electric discharge enunciated by the same writer in 1888, according to which electric waves impinging at right angles upon a kathode surface favour the dissipation of the charge upon it. This was proved experimentally by Hertz in the case of ultra-violet light, and by Elster and Geitel in the case of ordinary light impinging upon a liquid electrode in a vacuum. Wanka also proved it in the case of electro-magnetic waves. Hence, so the writer argues, light vibrations must have a component in the direction of propagation; they must, in fact, contain longitudinal as well as transverse waves. That this is so, is made extremely probable by the analogy of kathode rays. The latter have the vibration period of waves in wires, and are therefore pretty certainly longitudinal. Now comes the question how Maxwell's electro-magnetic equations, which do not admit of any but purely transverse vibrations, can be made to agree with these conclusions. Jaumann gives a simple answer. Let it be admitted that the specific induction capacity of a medium and its magnetic permeability are affected by the oscillations themselves. These "constants" will then be variable, and when introduced as such into the equations, longitudinal vibrations are at once seen to be possible. Each pencil of light will then be vibrating transversely along its centre line, and towards the outer edge the vibrations will become more and more longitudinal. This theory is a distinct innovation; but the author claims that it affords a natural and simple explanation of a large number of discharge phenomena. Thus the curious diffused reflection of kathode by a plane surface is easily reduced to the fact that Huyghen's principle of reflection no longer holds good.

ALTHOUGH we may still identify a particular disease with a particular microbe, yet there can be no doubt that the part

played by other microbes associated with pathogenic germs is of very great importance in determining the course pursued by the disease. The co-operation of bacteria is, therefore, a subject which is gradually more and more occupying the attention of bacteriologists, and in the last document issued by the Russian Imperial Institute of Preventive Medicine, M. Mashevsky has published a very extensive series of investigations on the effect upon the cholera bacillus of cultivation in the presence of other microbes. Several varieties of bacteria were isolated from the intestinal tract of man and animals, as well as from apples and cucumbers, and with these the cholera bacillus was then grown. The number of bacteria from these sources in themselves proved to be harmless, but which served to exalt the virulence of the cholera bacillus, appears to be very considerable. Perhaps one of the most interesting results is the discovery that cholera bacilli which had lost their virulence, regained it completely when associated with perfectly harmless bacteria isolated from apples and cucumbers. M. Mashevsky considers, therefore, that he has discovered a scientific basis for the popular prejudice which condemns the consumption of uncooked fruit and vegetables during epidemics of cholera. Prof. Metchnikow has already dwelt at considerable length upon the effect produced by the nature of the bacterial flora present in the intestine upon the virulence of cholera bacilli, and seeks to explain in this manner what may be described as some of the "vagaries" of cholera epidemics. The whole subject is one of great importance, but one which, involving as it does experiments of the most extensive and laborious nature, still requires an immense amount of work to place on a satisfactory basis. M. Mashevsky's investigations must be regarded as an important contribution in this direction.

MESSRS. CROSBY LOCKWOOD AND SON have nearly ready for publication a volume entitled "Light Railways for the United Kingdom, India, and the Colonies," by Mr. John Charles Mackay.

To the Hand-list of Orchids cultivated at the Royal Gardens, Kew, which has just been issued, is prefixed a preface giving an interesting historical sketch of the cultivation of orchids in this country. In the year 1890 as many as 766 species belonging to the order flowered in the Gardens.

THE first part of a "Géométrie Descriptive," by M. A. Gouilly, dealing with the geometry of points, straight lines, and planes, has been published jointly by MM. Gauthier-Villars and G. Masson, in the Aide-mémoire Series. The second volume of the work will be concerned with the sphere, cone, and cylinder of revolution, and conic sections; while changes in planes of projection and rotation will form the subject of the concluding volume.

THE *International Journal of Microscopy and Natural Science*, the fifth volume of which (third series) has lately been issued, contains many important contributions to the knowledge of nature in the animal, vegetable, and mineral worlds. The *Journal* is the organ of the Postal Microscopical Society, and is edited by Mr. A. Allen, with the assistance of three associate editors, viz. Prof. V. A. Latham (Chicago), Mr. J. S. Brown (Montreal), and Dr. F. Vicentini (Chieti). Naturalists generally, and workers with the microscope, will find much interesting and serviceable information in the new volume.

WHEN the Austrian Government took over the administration of Bosnia and Herzegovina in 1879, meteorological observations were commenced at a few stations, the number of which has now increased to seventy-seven; three of these are of the first order, or provided with complete self-recording instruments. The Government of these Provinces has recently published its first volume, containing hourly observations and curves for

Sarajevo and Mostar, daily observations at four stations, and monthly and yearly results at all the stations, for the year 1894. A fully-equipped mountain observatory has also been established on the Bjelasnica (lat. $43^{\circ} 42' N.$, long. $18^{\circ} 15' E.$), at an altitude of about 6800 feet; the publication of these results will commence with the next volume.

THE *Kew Bulletin of Miscellaneous Information* often furnishes us with material for notes; and in looking through the volume containing the numbers published during 1895, we are struck with the large amount of valuable information to be found in its pages. Kew has trained and sent out botanists to botanic gardens in most parts of the world, and it is chiefly due to them and the Director of the Royal Gardens, that the *Bulletins* are able to do so much to extend the knowledge of economic plants. The services thus rendered to the national welfare, by the publication of exact information with reference to botanical enterprise and the potentialities of newly-explored regions, cannot be over-estimated. All who wish to see how science can assist in developing the resources of our colonies, are advised to turn to the 1895 volume of the *Bulletin* of the Royal Gardens, and they will not be disappointed.

THE "Electrical Trades' Directory and Handbook for 1896" (14th year), published at the office of *The Electrician*, furnishes wonderful evidence of the extent of electrical industries at the present time. It consists of over five hundred pages of handbook matter, and nearly seven hundred pages of directorial information. The volume is invaluable to all who are concerned with the production and supply of electricity. Another handy book for electrical engineers and contractors is "The Universal Electrical Directory," published by H. Alabaster, Gatehouse, and Co. This publication, which has now reached its fifteenth year, contains a complete record of all the industries directly or indirectly connected with electricity and magnetism, and the names and addresses of manufacturers at home and abroad.

THE *Quarterly Statement of the Palestine Exploration Fund* (January 1896) contains the usual detailed record of careful exploring work. Of more general interest is the adventurous expedition of Mr. and Mrs. Gray Hill to the isolated and remarkable Crusaders' Castle of Khauranee, of which photographs are given. Lieut.-Colonel C. M. Watson has attacked the problem of the position of the Temple of Jerusalem. He states his views with much plausibility; his method is the scientific one of first considering the historical written evidence, and then the levels of Mount Moriah as it originally existed before Solomon began to build the Temple; and he has drawn his plans in accord with the historical documents, and also with what exploration has shown to be the actual facts. Lieut.-Colonel Conder has an essay on the Syrian language and the history of Samâla.

DR. G. BROWN GOODE's report upon the condition and progress of the U.S. National Museum, under the direction of the Smithsonian Institution, during the fiscal year ending June 30, 1893, has come to hand. The report is especially noteworthy on account of the description Dr. Goode gives of the development, organisation, scope, and work of museums generally, and the National Museum in particular. The description is lavishly illustrated by full-page plates reproduced from photographs of objects and cases in the museum. Bound up with the report are ten papers describing and illustrating collections in the National Museum, among them being "The Poisonous Snakes of North America," by L. Stejneger; "The Onyx Marbles," by G. P. Merrill; "The Cowbirds," by Major C. Bendire; "The Weapons and Wings of Birds," by F. A. Lucas; and "Ethnology of Tibet," by W. W. Rockhill. These papers, which are accompanied by numerous full-page plates, are most valuable contributions to knowledge. The papers, together

with Dr. Goode's report, fill nearly eight hundred pages, and the whole stands as striking evidence of the liberality of the Smithsonian Institution in matters of publication.

THE third annual report (vol. iv.) of the Iowa Geological Survey, dealing with the work accomplished under the auspices of the Survey during 1894, has been received. The report shows that a large amount of valuable information was accumulated with reference to the geological structure, and geological products of economic importance, in several counties of the State of Iowa. The method followed by Dr. Samuel Calvin, the State geologist, is to give reports of the geological features of each county separately. He recognises, of course, that this involves following an artificial subdivision of the State; for county boundaries have no relation to the distribution of geological formations. But, at the same time, he points out that the present citizens, as well as prospective settlers and investors, think not of naturally-defined areas, but of counties in which they become interested; and they will turn to the geological report of the several counties under consideration for information concerning the resources of them. Dr. Calvin reports that the work of the Survey continues to demonstrate that the Iowa coal-measures are far richer than they have been believed to be. The report is illustrated by numerous maps and figures, and is standing evidence of the vigour and thoroughness with which the work of the Survey is carried on.

AMONG the many interesting articles and notes in the number of the *Asclepiad* just issued (No. 44, vol. xi.), is a biographical paper on Dr. Thomas Young, by Sir B. W. Richardson, accompanied by a fine autotype portrait of him. Dr. Young is perhaps better remembered by his optical observations than for his medical researches. His mind was turned towards natural philosophy, and it was in that domain rather than in his profession that he earned distinction. He did, however, make some contributions to medical science. About the year 1813, he wrote an essay on the medical facts of climate, containing a large amount of valuable information. In the same year he prepared an introduction to medical literature, including a system of practical nosology, and his essay on consumption attracted considerable attention. Throughout his life he was a close student of vision and of the eye, and in the Bakerian Lecture which he delivered before the Royal Society in the first year of this century, he entered largely into the dimensions and refractive qualities of the eye, and the size of the pictures which are developed on the retina. It was in physical investigations that Young excelled, and especially in connection with interference and the wave-theory of light. He died in May 1828, after just completing his fifty-sixth year.

The current number of the *Berichte* contains an interesting historical note, by Dr. G. W. A. Kahlbaum, on the origin of the "Liebig's Condenser." The inventor of this indispensable piece of apparatus appears to have been C. E. Weigel, Professor of Chemistry and Botany at Greifswald. The account of this apparatus, with diagram, a facsimile of which is reproduced in the *Berichte*, first appeared in 1771, thirty years before Liebig was born. It should be noted, however, that Liebig never described this condenser as his own, but called it Götting's; and the latter, again, who seems to have made these condensers for Liebig, distinctly refers its invention to Weigel. On these grounds, Dr. Kahlbaum thinks it should be henceforth known as "Weigel's Condenser."

THE chemistry of the simpler organic fluorine derivatives, after a period of comparative neglect, has during the last few years been vigorously followed up, more especially in France. At the meeting of the French Academy of Sciences on February 3, two papers were presented on the acid fluorides, one

by MM. M. Meslans and F. Girardet, the other by M. A. Colson. In the first paper, the method previously used with success by M. Meslans in the preparation of other organic fluorine derivatives, the treatment of the corresponding chloride with metallic fluorides, was employed. M. Colson used a rather different method, the action of the halogen acid upon the organic acid in presence of a dehydrating agent. With hydrogen fluoride, the anhydride of the organic acid gives the best results; thus with acetic anhydride the reaction is



The operation, which must be carried out in a freezing mixture in a metallic flask, gives a theoretical yield. Acetyl fluoride boils at $20^{\circ}\cdot 8$ under a pressure of 770 mm., and its density at 0° is $1\cdot 0369$. Propionyl fluoride boils at 44° , and is lighter than water, its density at 15° being about $0\cdot 972$. Benzoyl fluoride, which has already been prepared by M. Guenez, is best obtained by acting with benzoyl chloride upon dry zinc fluoride, and is a liquid of extremely irritating odour, boiling at 154° .

THE additions to the Zoological Society's Gardens during the past week include a Common Viper (*Vipera berus*), British, presented by Mr. S. Ockenden; four Japanese Teal (*Querquedula formosa*, δ δ δ δ) from North-east Asia; two Smews (*Mergus albellus*, δ δ), European, a Black Lark (*Melanocorypha yellowensis*) from Siberia, purchased; a Purplish Death Adder (*Pseudechis porphyriaca*), a Punctulated Tree Snake (*Dendrophis punctularia*) from Australia, deposited; a Hybrid Pheasant Antelope (between *Tragelaphus gratus*, δ , and *Tragelaphus spekii*, δ), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

PERRINE'S COMET.—A telegram from Kiel announces the re-discovery of Perrine's comet by Dr. Lamp, on February 13. At 17h. 40m., Kiel mean time, it was in R.A. $19^{\text{h}}. 44^{\text{m}}\cdot 8$ and decl. $-2^{\circ} 22'$. The R.A. agrees well with the ephemeris published in NATURE on January 23, but the south declination is about a degree greater than that predicted.

A NEW COMET.—Another telegram from Kiel is as follows: "New comet Perrine Lamp, February 15, 17h. $28^{\text{m}}\cdot 6$, Kiel mean time; R.A. $19^{\text{h}}. 26^{\text{m}}. 44\text{s}$, decl. $-1^{\circ} 1' 56''$; daily movement in R.A. $7^{\text{m}}. 36\text{s}$, in declination $2^{\circ} 57'$ towards the north; bright." The new comet is thus in the immediate neighbourhood of the original Perrine's comet, but it has a much more rapid movement. Both comets are in the constellation Aquila, rising about 4 a.m.

THE ZODIACAL LIGHT.—During the last three years the zodiacal light has been very carefully observed by E. Marchand, under the advantageous conditions afforded by the observatory of the Pic du Midi, at an altitude of 2860 metres (*Bull. Soc. Ast. de France*, February). Ordinarily this phenomenon is best seen during the evenings of spring or in the mornings of autumn; but in the absence of the moon, when the sky is clear, it is seen at all times of the year from the mountain observatory, completely encircling the celestial sphere. The limits of the luminosity have been plotted on charts, and taking the mean positions of the boundaries, it is found that the width of the belt of light is about 14° , and that it is very nearly a great circle inclined 6° or 7° to the ecliptic, with a longitude of about 70° for the ascending node. Now the inclination of the sun's equator is about 7° , and the longitude of the ascending node is about 74° ; hence, it is concluded that the central plane of the zodiacal light coincides with the plane of the sun's equator.

The observations support the idea that the attenuated cosmical matter of which the zodiacal light is probably composed extends all round the sun, in the form of a very flattened ellipsoid of revolution, to a distance well beyond the earth's orbit.

In the part of the sky opposite to the sun, the brightness of the light is not greater than that of the most feeble parts of the Milky Way, but it becomes much more intense as the sun is approached. The increase of brightness in the direction of the

sun, however, is more rapid than can be accounted for merely by the increased thickness observed, so that a greater condensation of cosmical matter in the neighbourhood of the sun seems probable. Near the horizon, the width of the zodiacal light seems generally greater than that which traverses the sky; but it is pointed out that this may be due to the same cause as that which makes the sun, moon, or constellations appear larger when near the horizon. The "Gegenschein," or counter-glow, does not appear to have been noted.

SURFACE DRIFT OF JUPITER.—A useful summary of the various determinations of the rotation period of Jupiter in different latitudes is given by Mr. Stanley Williams (*Monthly Notices*, lvi. No. 3). Nine distinct currents can certainly be recognised, and their boundaries are pretty sharply defined, though possibly varying slightly in position from time to time. These currents, with the exception of that including the red spot, completely encircle the planet, travelling due east and west, and giving little or no indication of any movement towards or from the poles. In the following tabular statement the number of the zone or current is followed by the zenographical latitudes of its boundaries; then follows the average rotation period of the zone expressed in time and in terms of the equatorial period.

		Period.				
Zones.	Lat.	In time.			In terms of equatorial period.	
		h.	m.	s.		
I. ..	+85° to +28° ...	9	55	37·5	1'0089	
II. ...	+28° „ +24° ...	{	9	54	30	1'0071
			9	56	30	1'0104
III. ...	+24° „ +20° ...	{	9	48	0	0'9973
			9	49	30	
IV. ...	+20° „ +10° ...		9	55	33·9	1'0089
V. ...	+10° „ -12° ...		9	50	20	1'0000
VI. ...	-12° „ -18° ...		9	55	40	1'0090
VII. ...	-14° „ -28° ...		9	55	40	1'0090
VIII. ...	-18° „ -37° ...		9	55	18·1	1'0084
IX. ...	-37° „ -55° ...		9	55	5	1'0081

There is a remarkable want of symmetry in most of the currents. In the northern hemisphere the drift is nearly uniform from the pole to lat. 28° , and there is nothing equivalent to the red spot (zone VII.); in the southern hemisphere there is no counterpart of the region about lat. 25° , which is such a prominent feature in the northern hemisphere. It is suggested that atmospheric circulation in a north and south direction may take place through the narrow rifts which have been seen to traverse obliquely some of the belts and clear zones.

THE TEMPERATURE OF AIR AND THE PROBLEM OF AN ICE AGE.¹

THE mean temperature t of the air is determined by the balance of radiations received from the sun and from the soil with that given up towards the sky, and is ruled by the action of meteorological factors. According to Maurer's and Trabert's discussion of nocturnal temperatures, air radiation in the atmosphere is a linear function of its temperature; so radiations from soil and towards sky are expressed as proportional to the differences $[(t_s - t), (t - t_s)]$ of t from the mean temperature t_s of soil, and from the mean temperature t_e of an ideal stratum, the radiations of which would be equivalent to that of the whole atmosphere and of all the celestial bodies except the sun. This temperature t_e I call *temperature of the sky*.

Similarly, the mean temperature t_s of soil is determined (if we abstract from meteorological agents, that is in *solar climate*) by the balance of its radiation towards the sky [which is proportional to $(t_s - t_e)$] with that fraction of mean solar heat which is bestowed upon heating the surface considered. The mean annual solar heat received by unity of surface at the limits of the atmosphere (which is $0\cdot 305$ of the solar constant at the equator) diminishes with the latitude λ , not as $\cos \lambda$, but, according to Wiener's computations, as the cosine of an auxiliary angle ζ , which is 0° at the equator, and $65^{\circ} 31'$ at the poles, and which repre-

¹ I beg permission to briefly review the assumptions upon which Section II., 111. of "Le Cause dell' Era Glaciale" (Pavia, 1865) is based, and which the reviewer of the book in NATURE (No. 1348, vol. lii. p. 412) judged as far from satisfactory.—LUIGI DE MARCHI.